SCIENCE

18 December 1964

Vol. 146, No. 3651

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

ROMAN IMPERIAL EAGLE

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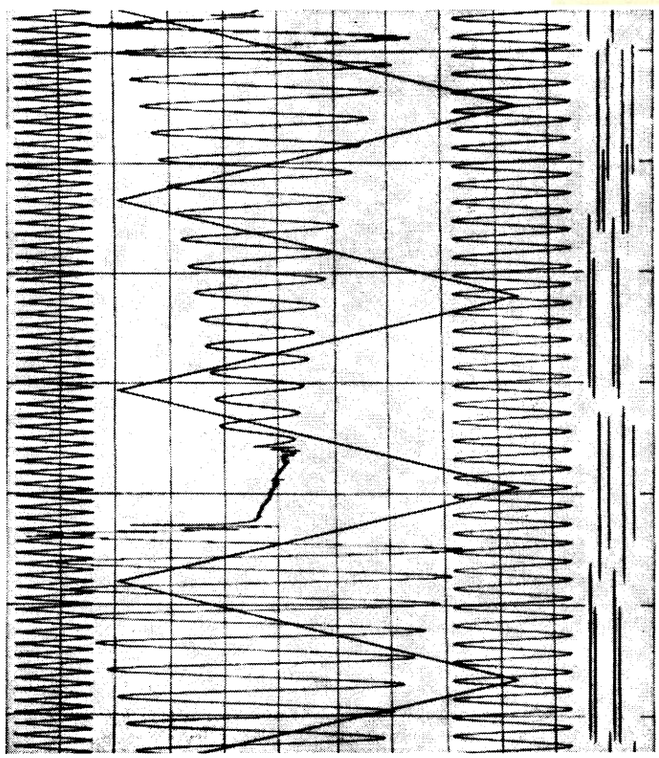

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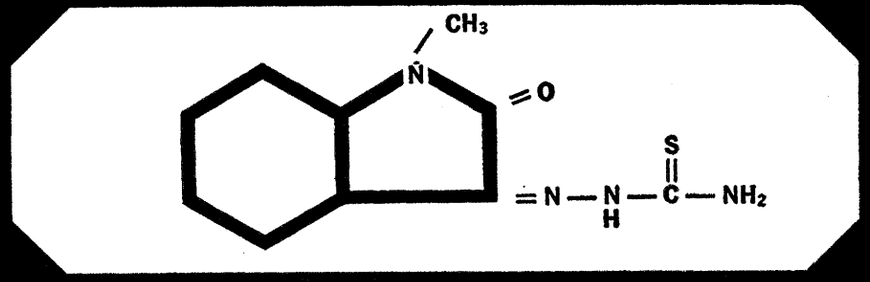

SIGNIFICANT ADVANCE IN SMALLPOX CONTROL

The first instance of successful prophylaxis of a virus disease by a synthetic chemical agent was reported recently by Bauer et. al. (1) (2).

MIBT N Methyl Isatin Beta Thiosemicarbazone was shown to be very effective protection for smallpox contacts regardless of vaccination status. In contacts who had primary vaccination, MIBT was more effective than revaccination in suppressing contact cases. It was also effective when contact was not detected in time for revaccination to offer protection.

Treatment of contacts began one day after admission as patients. They were observed for 16 days. During this time, only three mild cases of smallpox occurred among 1101 treated patients. Among a control group of 1126 untreated contacts, 78 cases of smallpox and 12 deaths occurred.

MIBT gave better results than were obtained with antivaccinal gamma globulin. And it can be made readily available and administered orally, thus simplifying administration to large groups.

Thompson, et. al. described antiviral activity of Isatin Beta Thiosemicarbazone in mice infected with vaccina virus (4). Easterbrook reported inhibition of infectious virus with IBT (1962) which resulted in immediate cessation of virus maturation and production. He suggested that IBT interfered with the process of maturation (5).

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References: (1) D. J. Bauer, L. St. Vincent, C. H. Kempe, A. W. Downie, Lancet, II, 494, (1963). (2) Lancet, II, 501, (1963). (3) C. H. Kempe, C. Bowles, G. Meiklejohn, T. O. Berge, L. St. Vincent, B. V. Sundara, Babu, S. Govindarajan, N. R. Ratnakannan, A .W. Downie, V. R. Murthy, Bull. Wld. Hlth. Org. (1961) 25, 41. (4) R. L. Thompson, S. A. Minton, J. E. Officer, G. H. Hitchings, J. Immunol (1953) 70, 225. (5) K. B. Easterbrook, Virology, 17, 245, (1962).

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COVER

Onyx cameo with relief of the Roman imperial eagle. The eagle became an emblem of the might of Rome when Marius in 104 B.C. had silver eagles mounted on the standards of the Roman legions. The loss of such a standard was regarded as a grave disaster; sometimes the legion was disbanded because of it. See review of *The Birth of Western Civilization*, page 1567. [Kunsthistorisches Museum, Vienna; Erwin Meyer]

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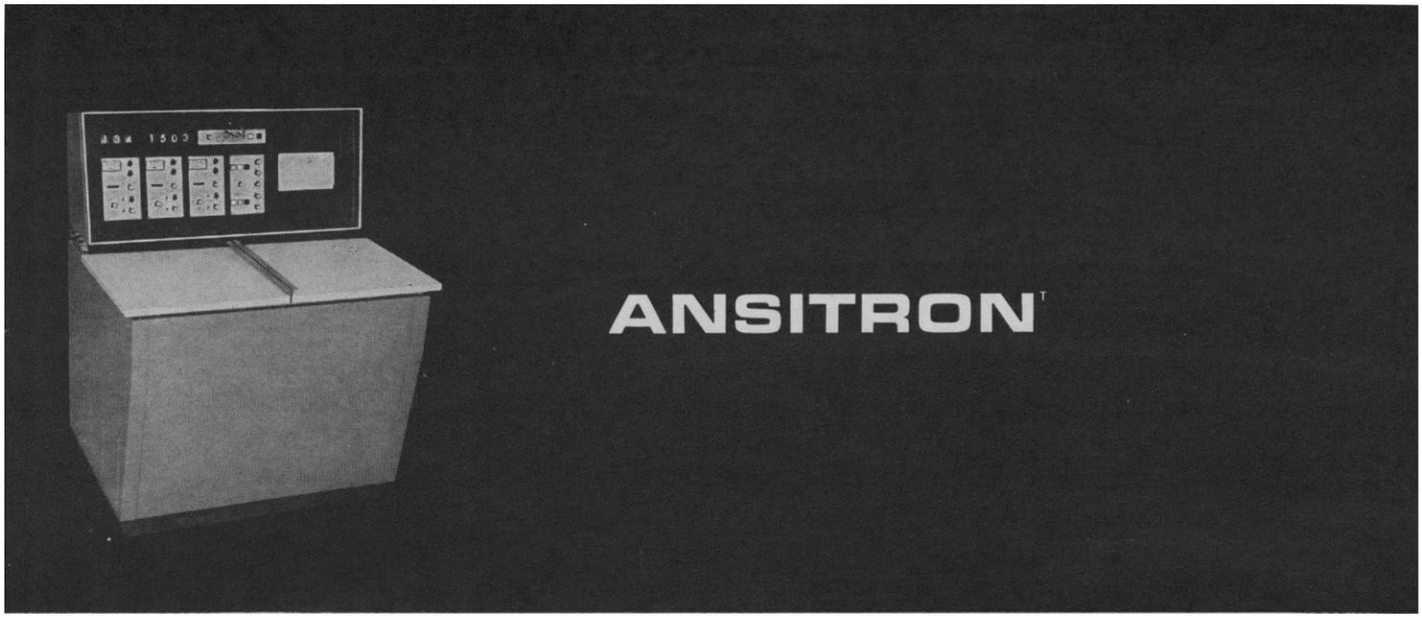

Liquid Scintillation Counting: Logarithmic Amplification Improves Performance and Simplifies Operation.

The principal problem confronting the bio-medical worker is the wide range of isotopic energies which he may be required to treat routinely from H^3 to P^{32}, with special emphasis on the ability to measure simultaneously H^3 and C^{14} and H^3 and P^{32}. In this latter situation pulses from the detector, as a result of maximum energy P^{32} events, will be approximately 100 times those from corresponding H^3 events and approximately 300 times those from H^3 events of mean energy.

A re-evaluation of the problems of counting these β-emitting isotopes has led to the development of a fast pulse-amplifier with logarithmic response. In the past, biochemists could only obtain instrumentation incorporating linear amplification. However, as the need for improved resolution and counting efficiencies has increased, it has become apparent that more functional design is necessary to overcome the inherent limitations of these linear systems.

The dynamic range of linear pulse-amplifiers for liquid scintillation is inadequate to cope with wide energy spreads. In early instrument designs having two channels, employing a single amplifier common to both channels, overall amplification was adjusted to examine the less energetic isotope at "balance-point" in one channel. The more energetic was counted in the second channel in integral fashion. Decay events from this isotope caused amplifier over-load thereby preventing accurate pulse height analysis.

More recently amplifiers preceded by separate attenuators have been inserted in each channel. Channel gain is individually adjusted, allowing differential counting in all channels. Though this technique results in improved performance, its incorporation in the counting system has created new problems:

First, the problem of linear amplifier overload though lessened, still remains. Whenever an energetic event occurs, overload will still occur in the channel operated at higher gain to examine the less energetic isotope. Should a low energy event occur before the amplifier has recovered from overload, it is not counted. This difficulty is partially overcome with fast-recovery amplifiers. However, at high count rates, even with these amplifiers, count loss is evident. *Second,* duplication or triplication of amplifiers and attenuators has multiplied the number of operating controls thereby increasing the complexity of operation. *Third,* stability may be a problem; several presumably identical amplifier-attenuator systems may not show identical performance after aging or thermal stress. *Finally,* it is difficult to achieve reproducible settings when using considerable attenuation for energetic isotopes.

The fast *logarithmic pulse-amplifier* overcomes these disadvantages. With a dynamic range extending over four decades of energy, overload is not possible with isotopes encountered in bio-medical research. Amplification is fixed and no adjustment, either of high voltage or of attenuators is required, thus greatly simplifying operation. With a logarithmic amplifier, drift — a problem common to all amplifiers — is logarithmic rather than linear. Remarkable stability is achieved since the drift is essentially inconsequential relative to the linear pulse height analysis section used, especially with wide window settings.

This capability of examining so wide an energy spread also tends to minimize effects of quenching. It is well known that these effects are partially overcome by operating the instrument to examine a very broad energy segment in which spectral shifts are less evident. A logarithmic system permits any energy range to be bracketed. The effects of quenching are therefore reduced by examining an energy spread encompassing, at the low end, the most quenched sample and, at the upper end, the least quenched. Even with so wide a spread differential backgrounds are low relative to the integral backgrounds observed with older linear systems.

A corollary to wide-range operation is that a single instrument setting may suffice for most samples of a given isotope. This is of particular advantage when several investigators use the same instrument for they can use common settings and count different types of samples with no compromise in performance.

Logarithmic amplification allows comparison of the spectra of various isotopes on the same scale. This is not possible with linear amplifiers. The energy relationship between isotopes is clearly evident and optimum settings for single or dual-label samples are quickly arrived at.

Logarithmic amplification has permitted the elimination of numerous operating controls. Only discriminator adjustments are necessary, thereby enabling the attainment of excellent performance for single or dual label counting in one or two minutes.

For more information and bibliography contact:

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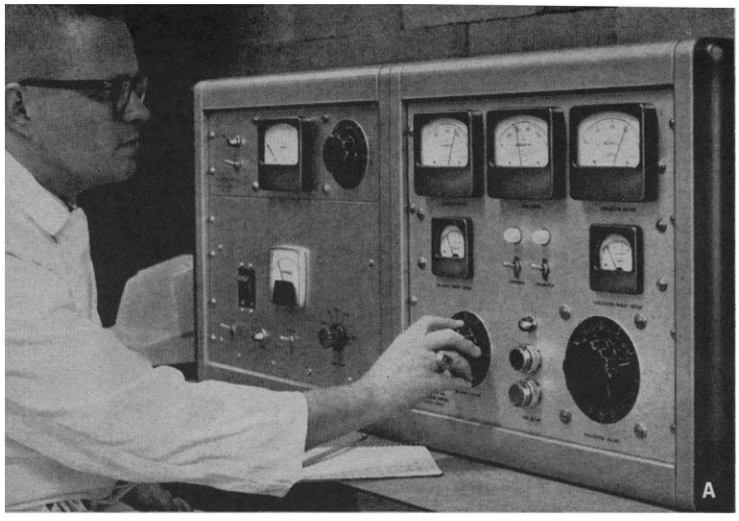

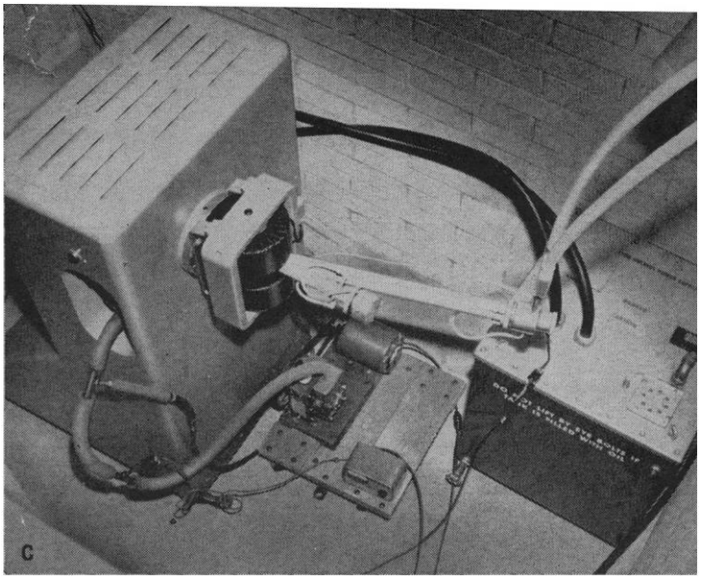

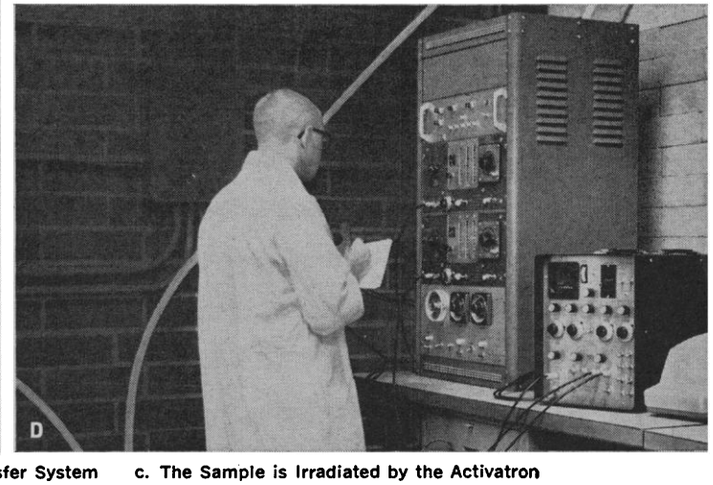

a. Activatron Controls are Set b. Loading the Sample Transfer System c. The Sample is Irradiated by the Activatron
d. The Sample's Nuclear Spectrum is Analyzed by the Pulse Height Analyzer

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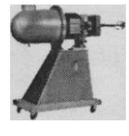

The Sample Transfer System (single and dual units available) is completely automatic. The sample "rabbit" is inserted in the receptacle on the control unit and transferred by compressed air to the Activatron target holder. After irradiation, the sample is automatically transferred to a scintillation detector for a preset counting period. The complete system includes the control unit, irradiate and counting stations, conveyor tubing and compressor.

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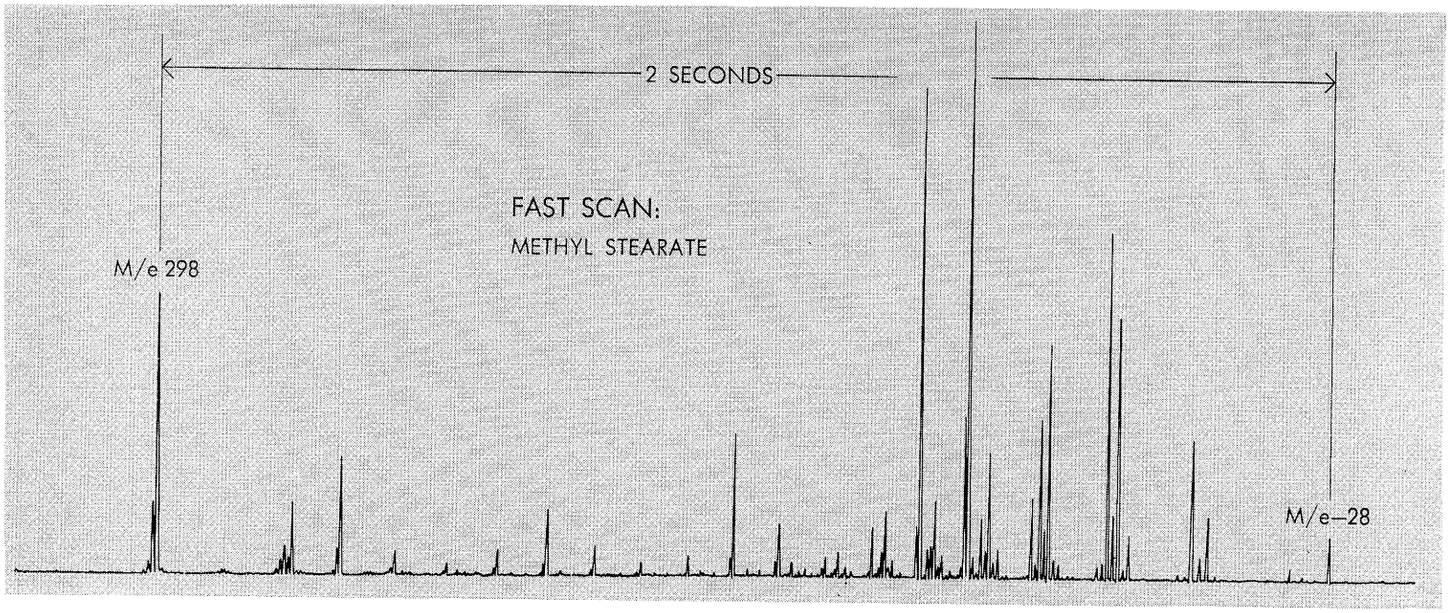

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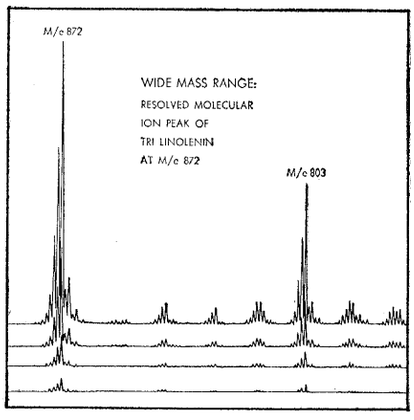

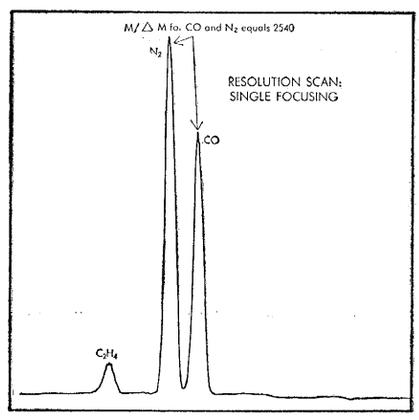

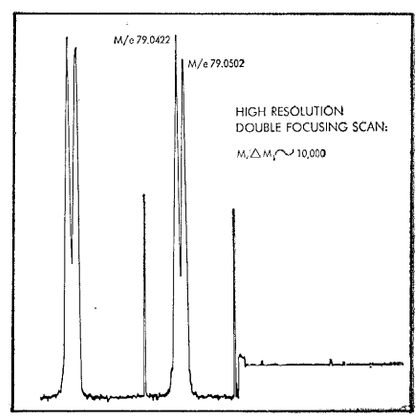

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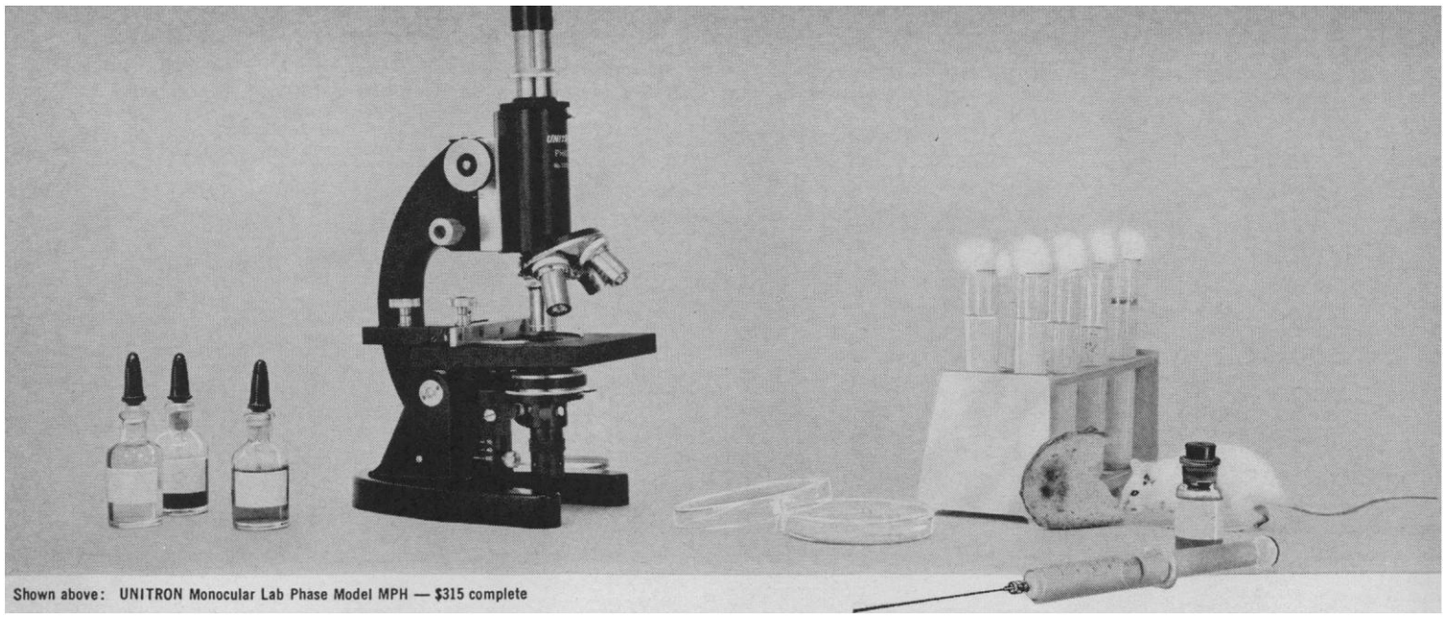

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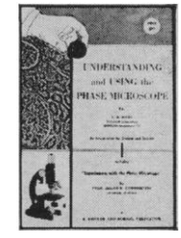

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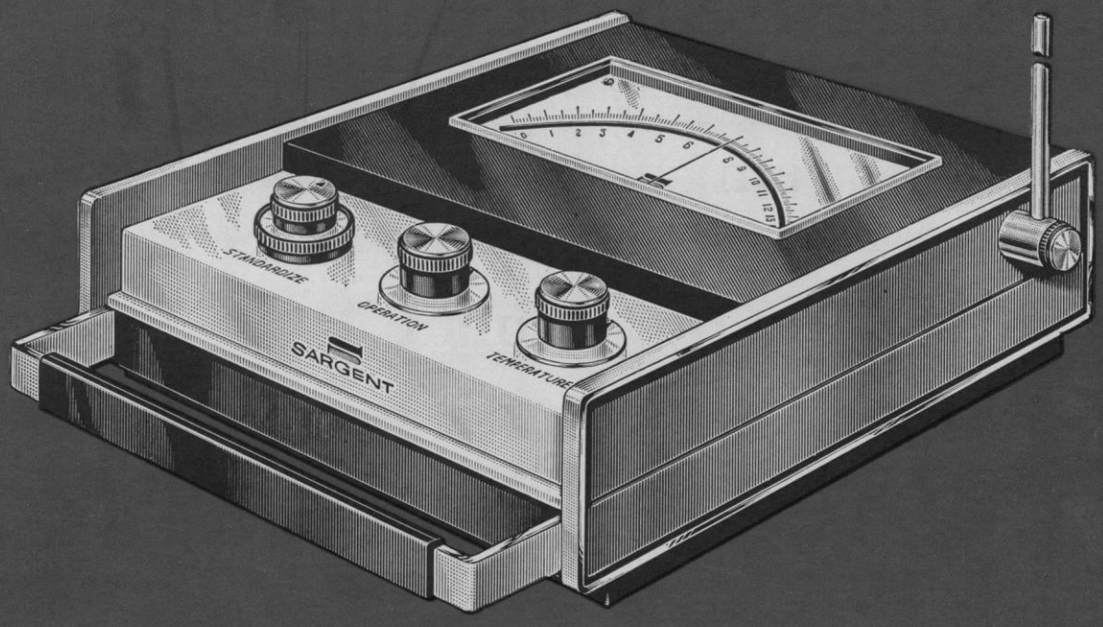

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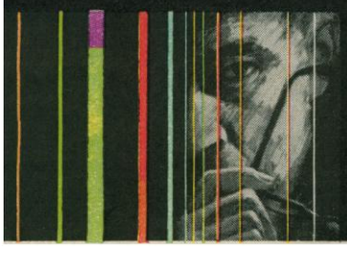

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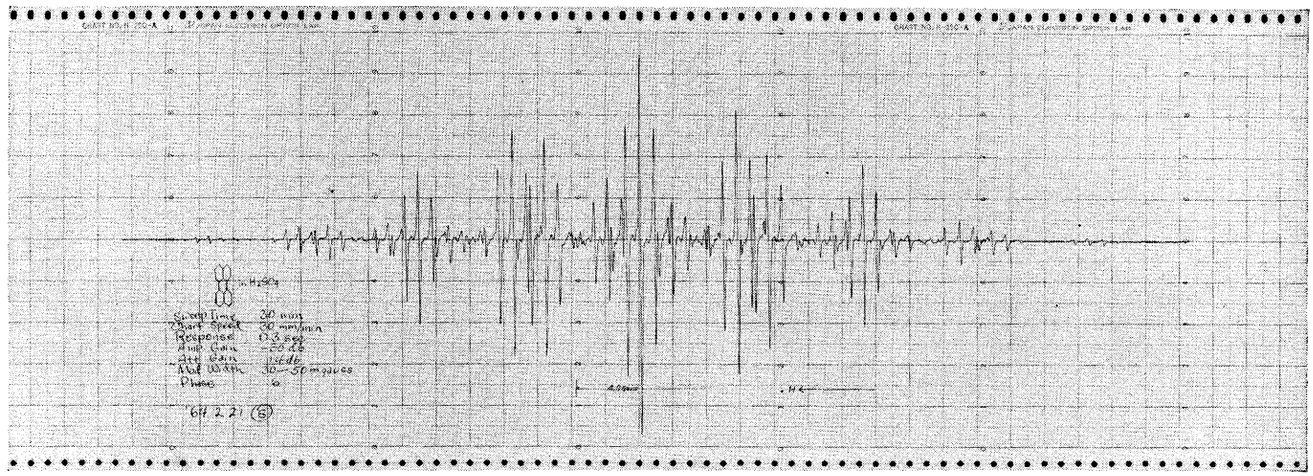

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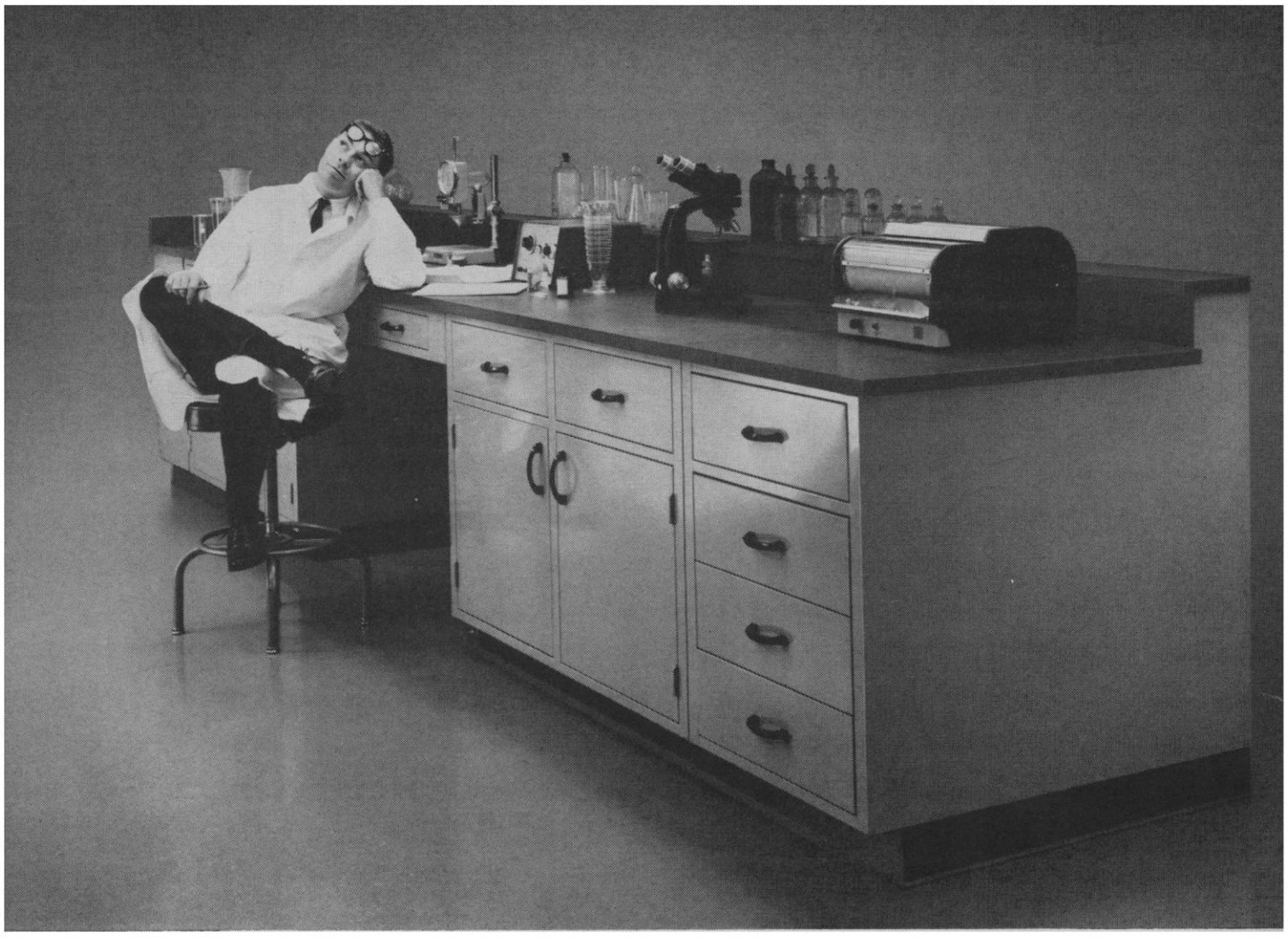

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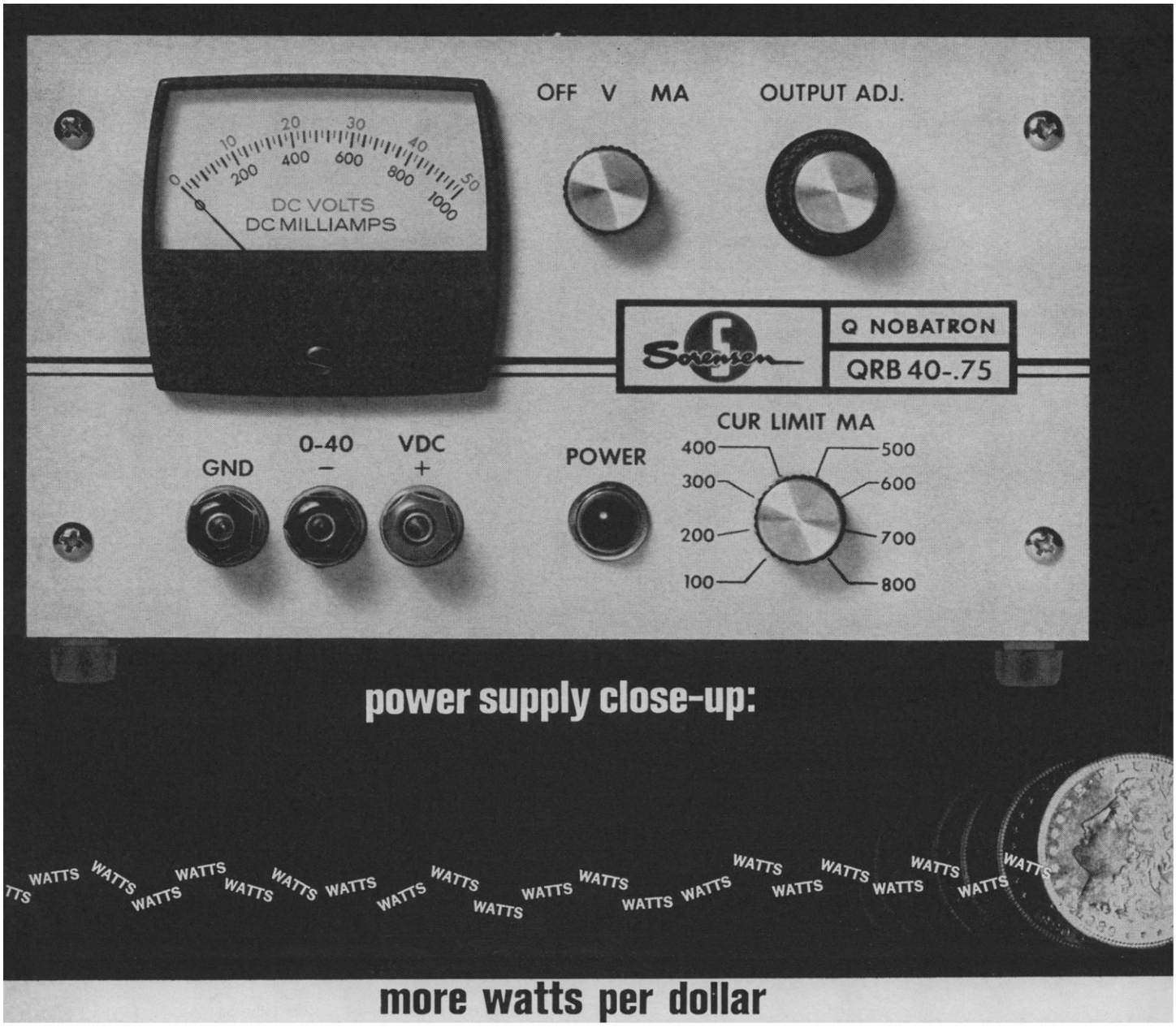

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QRB15-2	0-15	0-2	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB20-1.5	0-20	0-1.5	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB30-1	0-30	0-1	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75
QRB40-.75	0-40	0-.75	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅛	9	5¼	10.75

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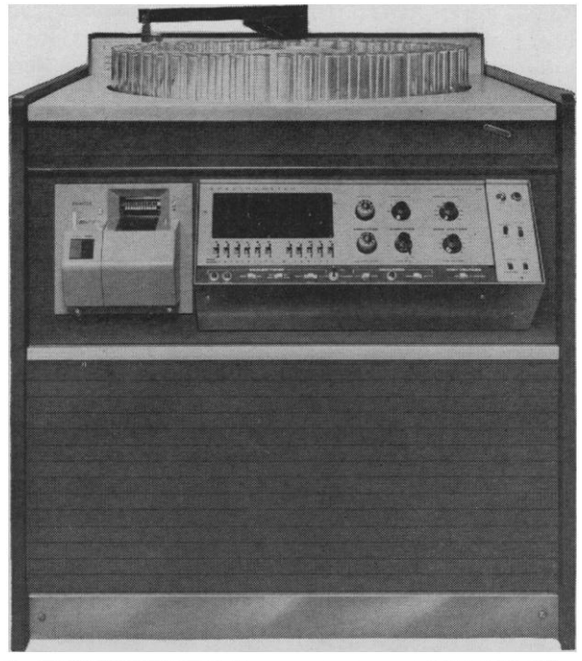

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shouldn't behave as though assumptions are facts, but add that neither is there justification for claiming that races are genetically equal until supported by firm evidence.

Montagu writes approvingly of conception control for all who, either because of genetic limitations or because of poor cultural heritage, are unable to endow children with a reasonable chance to achieve happiness, self-sufficiency, and good citizenship. Montagu and I could quibble over several points, but our only serious disagreement is on his position that the question of race and intelligence is untestable and unimportant. I am glad to see him acknowledge that heredity plays a role in intelligence. Many social scientists teach that intellect is entirely or almost entirely the product of environment and, hence, are unworried about high birth rates among the incompetent.

Rabin, seemingly unworried about the threat of overpopulation, recoils from the recommendations on conception control as being ruthless and inept. He recommends that we not attend to bad culture and behavior, for they are matters of private judgment.

I thank Paula Giese for documenting my claim that such views as hers are held. Here is an expression of doubt that there is a genetic basis for intelligence and a characterization of the proposal that the problem be studied as a mischievous suggestion. She implies that private enterprise should not have a role in upgrading genetic and cultural heritage. The success of integration in the Hyde Park-Kenwood community was achieved largely by private organizations. The integrated housing of Lake Meadows and Prairie Shores and many others was built by private funds. On the national scene, the NAACP, the Urban League, religious organizations, and so on are private enterprises supported by private funds which have facilitated the advancement of the underprivileged.

Fischer doubts that any scientist has proposed that members of another race have an average innate ability superior to those of his race. I am among the non-Jews who consider it probable that superior intelligence and genius occur more frequently among Jews, until recently a disadvantaged people. Jews are less a "race" than Negroes, but races are not randomly represented in this minority group. Fischer imagines that I propose eugenic measures which would select only for intelligence. There are many other important qualities of physique and intellect. I have never proposed a basis for selection.

Fischer and Deakin disagree with my doubts about encouraging interracial marriage. Many integrationists claim that it is not an issue. It is a real and highly sensitive issue, for interbreeding is being encouraged as a means of resolving racial problems. What is wrong with an interracial marriage between culturally and intellectually compatible Negroes and whites? Too little is known of the biological consequences. The question of race and intelligence is unsettled. Less is known of the inheritance of various drives and behavior traits and their relationship to race. We look in vain for a country which is governed wisely by Negroes. Racial mixing cannot be undone. Let's facilitate Negro advancement by full civil rights and equal opportunity, reward and honor their achievements, prevent human misery of every race, but without accepting the social scientist's assurance that the biological experiment of interbreeding can be done without risk to civilization.

Parton complains of my reference to the unpublished studies of Strodbeck. These careful, extensive, and highly significant studies will be published. Strodbeck has kindly given me detailed reports on completed but unpublished phases of the research. I did not, as Parton claims, accept the conclusions of Shuey, but simply mentioned that Shuey and Anastasi had reviewed much the same subject and had reached widely different conclusions.

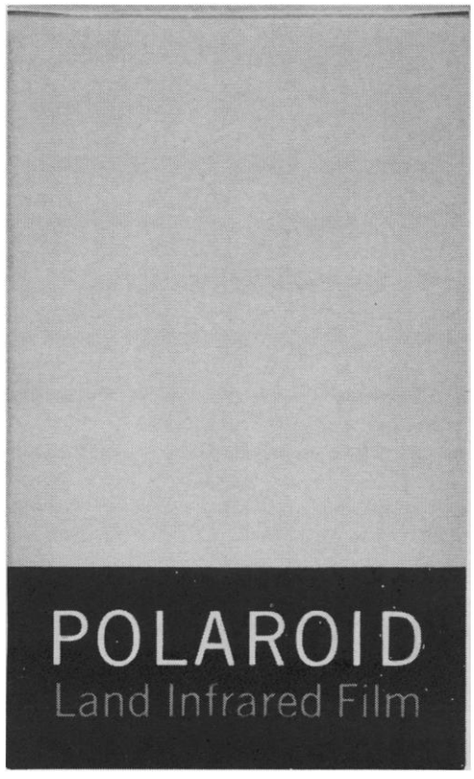
Each point made by Snow and Seibert was anticipated in my article. In regard to studies on identical twins, I said that "the same studies also demonstrate the importance of environment." I wrote only of a genetic basis for intelligence and made no claim that intelligence is fixed and have never imagined that there is a unitary ability to learn or reason.

I have a final word on the right of the scientist to dissent against attempts to close systems of knowledge. In science we demand validation of each claim to knowledge by rigorous and critical tests of evidence. Positive claims are not final until there is proof that all alternative propositions are untenable. Science does not abdicate to authority or the tyranny of dogma—nor does it try to shape truth by aims and value judgments.

DWIGHT J. INGLE

Department of Physiology, University of Chicago, Chicago 31, Illinois

Polaroid announces infrared film. Development time: 15 seconds.



You may know we've been field testing it for the past several months. Well, we're ready with it now. And it's available in unlimited quantity.

It's called Polaroid Type 413 Land Infrared Film. Its sensitivity to radiation extends from the visible region of the spectrum to beyond 9000 Å in the infrared, peaking at about 8400 Å. It is a high-contrast material. H & D reflection gamma is 2.1. It comes as a roll film with 8 exposures to the roll. It fits all standard Polaroid Land cameras and camera backs using series 40 film (except the J-66). And it's as easy to use as any other Polaroid Land film.

This new film has two important advantages over conventional infrared film. Most important, of course, is instant development. You get a finished print 15 seconds after you snap it. You know, on-the-spot, if you got the picture you wanted. And if it's not perfect you can take another while everything is still set up.

The other advantage is its high speed. Type 413 infrared film is more than three times as sensitive as conventional infrared film. ASA equivalent is 800 without filtration.

We expect this remarkable film to find wide use in just about every area of industrial and scientific photography. In laser research, spectrographic analysis, plant pathology, general medical research, and specialized industrial photography where heat is a factor. If you have a need for infrared recording we expect you'll be using it soon. For further information, write Sales Department, Polaroid Corporation, Cambridge, Massachusetts 02139.

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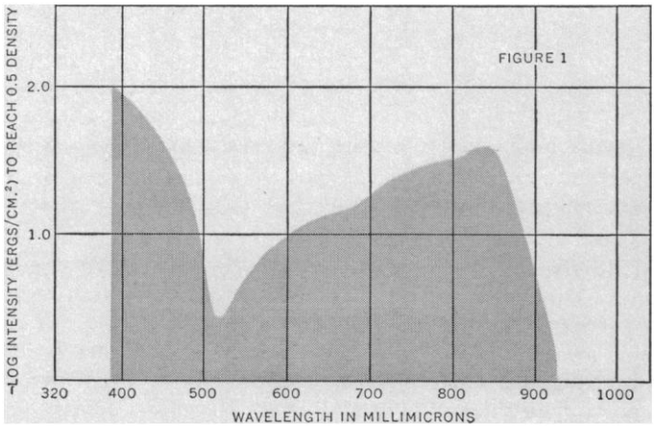
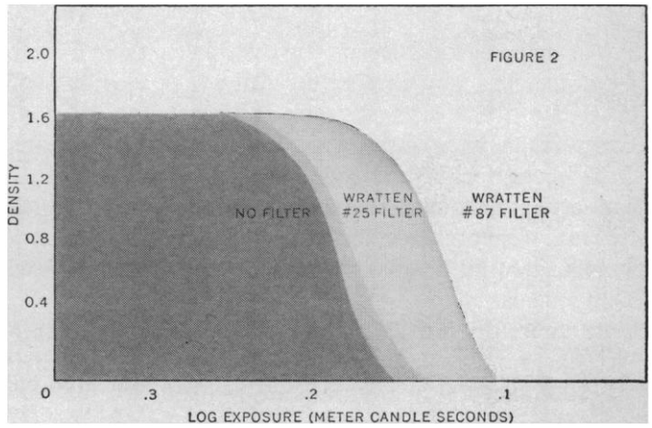
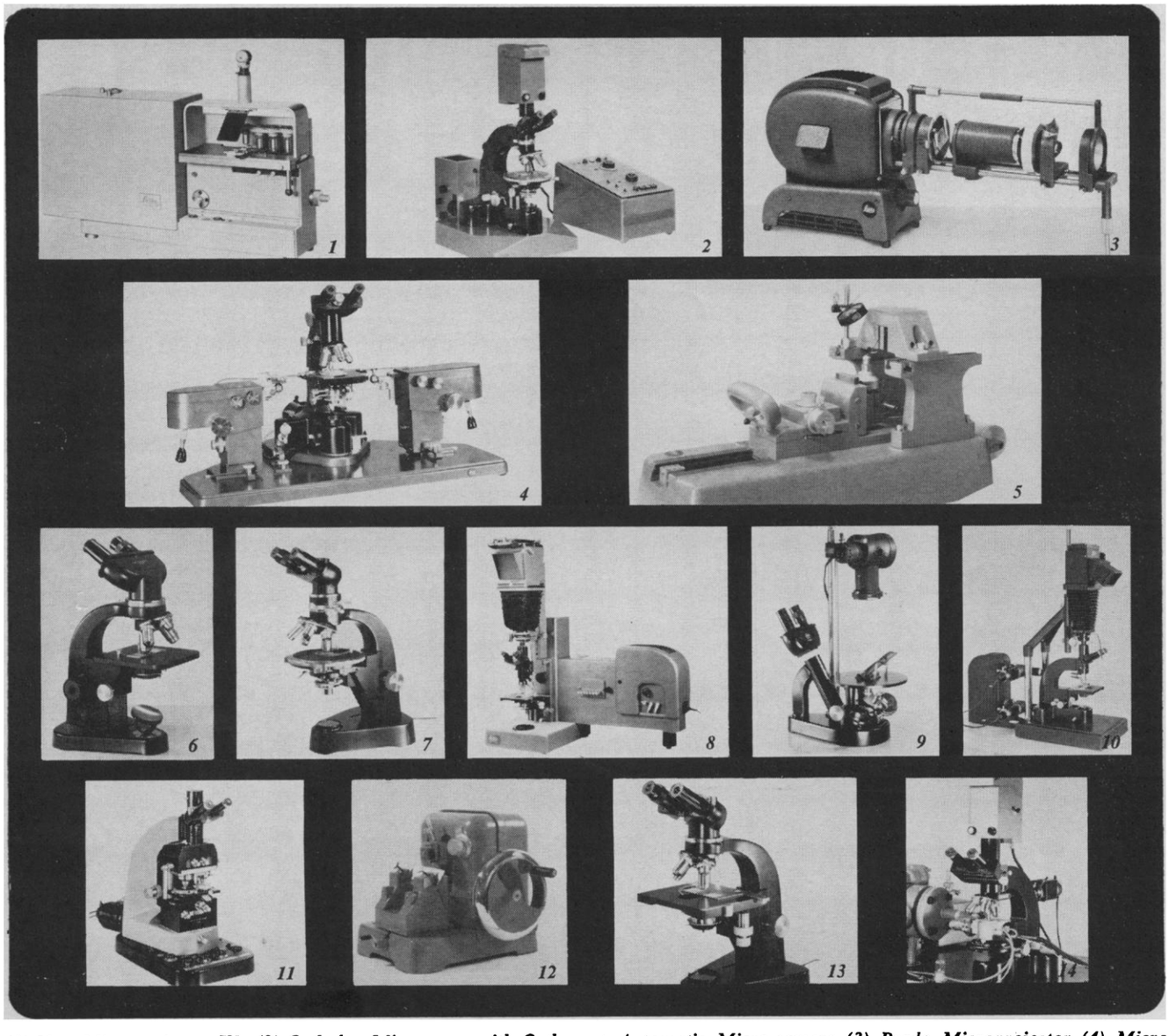
SPECTRAL SENSITIVITY. This graph illustrates the spectral response of Type 413 film.



CHARACTERISTIC CURVES. This graph illustrates average H & D characteristics of Type 413 film. (Tungsten light source, 3000°K.)





(1) New Microprojector XIc (2) Ortholux Microscope with Orthomat Automatic Micro-camera (3) Prado Microprojector (4) Micromanipulator (5) Base Sledge Microtome (6) SM Microscope (7) Dialux-pol Large Polarizing Microscope (8) Panphot Large Camera Microscope (9) Inverted Microscope (10) Aristophot Universal Photomicrographic and Macrophotographic Camera (11) Interference Microscope (12) Large Minot Rotary Microtome type 1212 (13) Labolux Microscope (14) Ortholux Microscope with Heating Stage

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18 December 1964, Volume 146, Number 3651 **SCIENCE**

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Desalination of Water

There is world-wide interest in means for obtaining more fresh water. President Johnson recently indicated his views, in part, by quoting a statement made by President Kennedy: "There is no scientific breakthrough, including the trip to the moon, that will mean more to the country which first is able to bring fresh water from salt water at a competitive rate. . . ."

Much of the U.S. effort aimed at desalination of water has been conducted under the Office of Saline Water of the Department of the Interior. The OSW has sponsored some imaginative work—for example, development of a reverse osmosis process. Given a membrane permeable only by water, it is possible to obtain fresh water from sea water by exerting a differential pressure of about 24 atmospheres on salt water. In turn, it is theoretically possible to obtain a cubic meter of fresh water from sea water by the expenditure of about 0.7 kilowatt-hours of energy, the minimum amount for a reversible process. The present cellulose acetate membranes, however, are not perfect. A pressure of 100 atmospheres is required to produce water at the rate of 370 liters per square meter of membrane surface per day. The effluent, while potable, is not entirely free from salt. The membranes have only a few weeks of service life.

Another process involves formation of clathrate compounds. If propane, under pressure of 3 atmospheres, is bubbled into sea water at about 6.5°C above the freezing point, a light solid composed of 17 molecules of water to one molecule of propane is formed. Salt is excluded. The solid can be removed and the water readily obtained. In a practical process, energy consumption might amount to between 3.5 and 12 kw-hr per cubic meter of water.

Another method, which may be used practically, is freezing. It is attractive because the latent heat is small, and low-temperature processes are relatively free from corrosion problems. Energy cost for a practical freezing scheme has been estimated at 12 kw-hr/m^3.

Without heat exchange, the energy requirement for distilled water is about 700 kw-hr/m^3. With heat exchange this figure has been reduced to 70 kw-hr/m^3 in "demonstration plants," and it could be reduced to somewhat lower values through greater investment for equipment. The price of obtaining fresh water from sea water is heavily dependent on the cost of energy. Recently it has been pointed out that very large nuclear reactors could be particularly efficient. In situations where a dual-purpose electricity and water plant are feasible, costs for distilled water have been estimated at about 6 cents per cubic meter. (Costs of raw fresh water in coastal regions of the United States range from about 0.1 to about 6.0 cents per cubic meter.) In high-cost areas such as southern California, some of the needs probably could be met by desalination through distillation. In the eastern half of the nation, where total supplies are adequate and cheap, better utilization of natural supplies is the practical solution.

It is to be hoped that a balanced approach will be made to the water problem. Adequate emphasis should be given to research and to development, particularly of promising new processes. At the same time it should be remembered that most of this nation's water problems will be solved by wise use of what is naturally available.

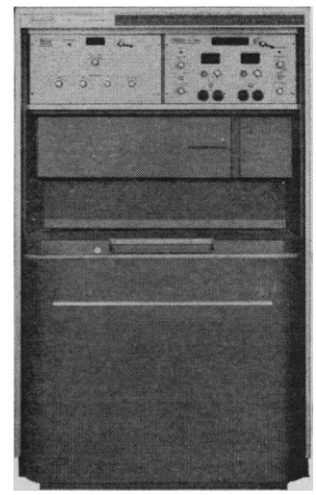
—PHILIP H. ABELSON

Quench Determination IN NEW TRI-CARB® SPECTROMETERS

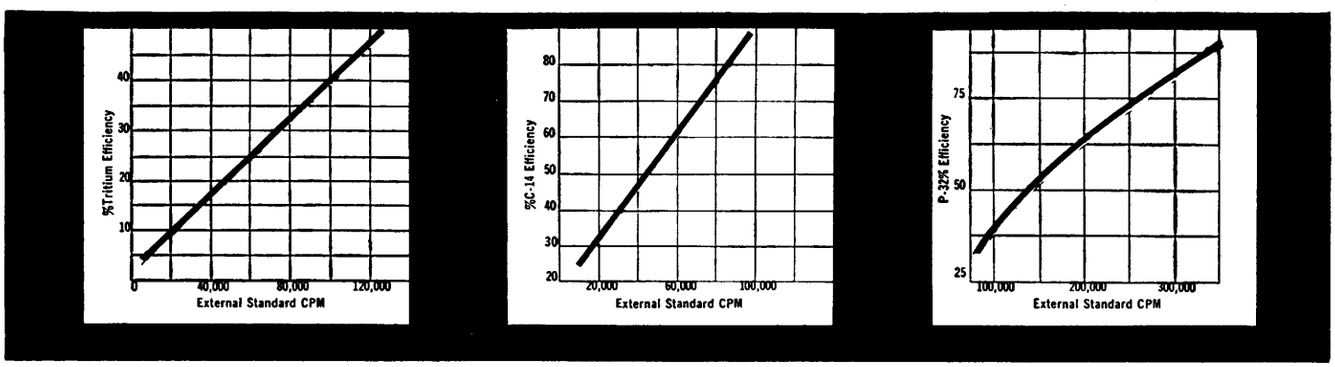
AUTOMATIC EXTERNAL STANDARDIZATION—In liquid scintillation counting, the most accurate quench determinations require that each sample be counted twice . . . with and without a known standard. Originally, this involved the addition of carefully measured amounts of an *internal* standard. Now, a new Packard development automatically introduces an *external* gamma standard into the counting chamber immediately after each sample count is recorded. The tedious and time-consuming addition of internal standards is no longer necessary, and the samples remain unaltered for further counting if desired.

The small sealed gamma standard used in Tri-Carb Spectrometers is transported rapidly and reliably by means of a pneumatic tube between a well-shielded, remote storage location and a precisely reproducible position in the counting chamber. It provides gamma radiation with energies well above those of the beta emitters commonly counted in liquid scintillation samples. When positioned adjacent to the counting vial, it generates a Compton electron spectrum in the sample and produces a light output that is affected by quenching substances in essentially the same way as the light produced by beta particles from the sample isotopes.

By adjusting the Tri-Carb Spectrometer to record the energetic portion of the Compton spectrum in one channel, sample counting efficiencies may be determined directly from curves such as those shown in Figures 1, 2 and 3. This method is entirely independent of the radioactivity of the samples, and good precision is obtained with only one-minute counts of the relatively high activity gamma standard regardless of the activity level of the sample.



3000 SERIES



Automatic External Standardization is standard on all 4000 Series Tri-Carb Spectrometers, and optional on most 3000 Series instruments. Furthermore, in line with Packard's policy of providing new features for existing instruments wherever possible, Automatic External Standardization is also available as a field modification for most 3000 Series Spectrometers.

CHANNELS RATIO—When sample activity is reasonably high and when quenching is not too severe, the Channels Ratio method may be used to determine counting efficiencies. This technique utilizes the radioactivity of the sample itself for determination of the degree of quenching. The change in spectral shape that results when colored or chemical quenching substances are present in a sample is measured by the change in ratio of the net counts in two channels of pulse height analysis selected to span certain portions of the spectrum. These ratios may be directly correlated with counting efficiencies of samples as shown by the curves in Figures 4 and 5.

Various models of 3000 and 4000 Series Tri-Carb Spectrometers provide calculators or true electronic digital computers programmed to present, in *addition* to total net counts *and* net count rate for each channel, all of the possible channel ratios.

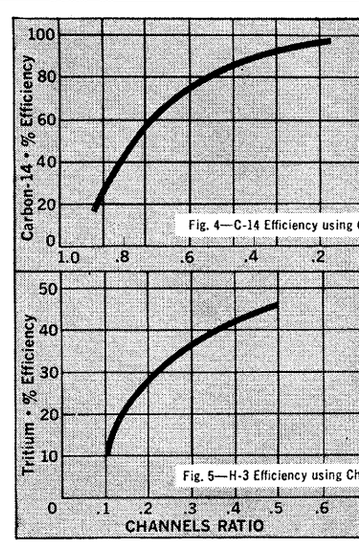


Fig. 4—C-14 Efficiency using Channels Ratio

Fig. 5—H-3 Efficiency using Channels Ratio

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proval of pursuit of these new programs will permit a continuation of the excellent start made in this conference. It is now expected that a year's time will show improvement in undergraduate training in optics and increased pressure on undergraduates to continue for graduate research.

The task leaders will publish status reports for these programs in the Society's journals as various objectives are accomplished.

Aden B. Meinel is starting a graduate program at the University of Arizona which, in cooperation with the departments of mathematics, physics, and engineering, will turn out personnel experienced in optics. His talk was concerned with the premises and philosophy behind the effort rather than with the program itself.

As studies have shown, industry—through neglect on the part of the universities—has assumed the principal role in training its specialists in optics (approximately one percent of physics graduate students are doing research in optics, yet 8 to 10 percent of all employed physicists are working in optics). It is certainly true (as a consequence?) that industry, and not the university, gets the greatest share of government support for basic research in optics. This is felt not to be the best relationship that could exist between university and industry in the research area. The reversal and restoration of proper responsibilities will require understanding and cooperation among universities, industry, and government. Meinel outlined four basic steps which must be taken in order to restore the university's role:

1) The university must provide the leadership to recruit a core faculty from industry.

2) The university must obtain from private and public sources a commitment for basic support over a period of several years which would provide for a liberal growth rate.

3) Money must be provided for construction of the physical plants required. This is a major hurdle, since such plants do not now exist in universities and a program cannot succeed on too little too late.

4) There must be funding of a number of research projects with specific objectives which, when combined with the funds which should be made available to institutions, will provide the means of engaging in advanced research. Some of this support for specific projects will be of the type that

industry is now receiving. In return, the university should not undertake more projects than are needed to further its prime objective, the training of personnel in optics.

There followed a fairly lively discussion of all facets of the "optics problem." However, compared to the somewhat bitter symposium at the annual meeting just 2 years ago, there is evidence of increasing understanding on the part of the members of what is occurring.

Optics is no longer an active discipline of physics. Neither is heat, sound, or mechanics. However, optical techniques are major tools of all branches of physics, and therefore physicists must themselves provide or find some means of obtaining personnel competent in optics.

Engineers must recognize that much of the resurgent need in optics is in the field of optical engineering, in which new components and systems for space reconnaissance, surveillance, and information processing are required. Engineers, like physicists, have a great need for competent workers in optics.

The pervasive influence of optics on physics, engineering, biology, and physiology may result in programs similar to Meinel's in which a graduate facility works with all departments.

Optics is an excellent area of research to be entered into by faculty members in small colleges, because the cost of equipment is often less than in other fields. It is still difficult for such faculty members to get requests for grants appreciated by granting agencies. However, there is evidence of increasing interest in optics by the Department of Defense; there is evidence that the small-college teacher can make his needs understood; and there is evidence that optics education is enlarging.

The meeting adjourned with a more optimistic outlook than prevailed 2 years ago.

VAN ZANDT WILLIAMS
Perkin-Elmer Corporation,
Norwalk, Connecticut

Forthcoming Events

December

26–31. **American Assoc. for the Advancement of Science**, annual, Montreal, Canada. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C.)

The following 44 organizations will meet in conjunction with the AAAS an-

nual meeting in Montreal, Canada, 26–31 December:

Academy Conference (J. T. Self, Dept. of Zoology, Univ. of Montreal, Montreal)

Academy of Psychoanalysis (M. Ullman, Maimonides Hospital, 4802 Tenth Ave., Brooklyn 19, N.Y.)

Alpha Epsilon Delta (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y. 10708)

AAAS Commission on Science Education (J. R. Mayor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

American Astronautical Soc. (E. van Dreist, Director, Space Science Laboratory, North American Aviation, Downy, Calif.)

American Astronomical Soc. (G. C. McVittie, Univ. of Illinois Observatory, Urbana)

American Economic Association (H. E. English, Private Planning Assoc., 712 Sun Life Bldg., Montreal 2)

American Meteorological Soc. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass.)

American Nature Study Soc. (V. Rockcastle, Cornell Univ., Ithaca, N.Y.)

American Soc. of Naturalists (S. Granick, Rockefeller Inst., 66th St. and York Ave., New York 10021)

American Political Science Assoc. (E. B. Skolnikoff, Massachusetts Inst. of Technology, Cambridge)

American Soc. of Criminology (W. C. Reckless, Dept. of Sociology, Ohio State Univ., Columbus)

American Soc. for Microbiology (S. J. Ajl, Director of Research, Albert Einstein Medical Center, York and Tabor Rds., Philadelphia 41, Pa.)

American Soc. of Zoologists, Animal Behavior and Sociobiology Div. (G. W. Barlow, Vivarium Bldg., Wright and Healey Sts., Univ. of Illinois, Champaign)

American Sociological Assoc. (W. E. Moore, Russell Sage Foundation, 230 Park Ave., New York, N.Y.)

Animal Behavior Soc. (J. P. Scott, Jackson Laboratory, Hamilton Station, Bar Harbor, Maine)

Association canadienne-française pour l'Avancement des Sciences (M. J. Beauregard, ACFAS, C.P. 6128, Univ. of Montreal, Montreal)

Association for Computing Machinery, Bio-group (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)

Biometric Soc. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)

Canadian Aeronautics & Space Inst. (H. C. Luttman, CASI, 77 Metcalf St., Ottawa 4)

Canadian Assoc. of Geographers (J. T. Parry, Morrice Hall, McGill Univ., Montreal)

Canadian Assoc. of Physicists (A. C. H. Hallett, Dept. of Physics, Univ. of Toronto, Toronto 5)

Canadian Science Fairs Council (H. I. Bolker, Pulp & Paper Research Inst. of Canada, 3420 University St., Montreal 2)

Canadian Soc. Zoologists (J. Marsden, McGill Univ., Montreal, Canada)

Ecological Soc. of America (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)

Engineering Institute of Canada (G. T. Page, EIC, 2050 Mansfield St., Montreal)

Entomological Soc. of Canada (I. S.

Lindsay, Defence Research Board, 125 Elgin St., Ottawa)

History of Science Soc. (J. E. Murdoch, Harvard Univ., Cambridge, Mass.)

Institute of Management Sciences (B. V. Dean, Dept. of Management, Case Inst. of Technology, Cleveland, Ohio)

Metric Assoc. (R. P. Fischelis, Ohio Northern Univ., Ada)

National Assoc. of Biology Teachers (R. Beidleman, Colorado College, Colorado Springs)

National Assoc. of Science Writers (L. S. Zahn, Hill & Knowlton, Inc., 150 E. 42 St., New York, N.Y.)

National Council of Teachers of Mathematics (J. Gates, NCTM, 1201 16th St., NW, Washington, D.C.)

National Geographic Soc. (R. W. Gray, NGS, 16th and M Sts., NW, Washington, D.C.)

National Inst. of Social and Behavioral Science (D. P. Ray, NISBS, 863 Benjamin Franklin Station, Washington, D.C.)

National Science Teachers Assoc. (A. F. Eiss, NSTA, 1201 16th St., NW, Washington, D.C. 20006)

Pharmacological Soc. of Canada (C. W. Nash, Dept. of Pharmacology, Univ. of Alberta, Edmonton)

Sigma Delta Epsilon (S. C. Stevens, VA Hospital, Lincoln, Neb.)

Society for Computer Science in Biology and Medicine (R. S. Ledley, Natl. Biomedical Research Foundation, 8600 16th St., NW, Silver Spring, Md.)

Society for Economic Botany (Q. Jones, New Crops Research Branch, Plant Industry Station, Beltsville, Md.)

Society for General Systems Research (J. H. Milsum, Dept. of Electrical Engineering, McGill Univ., Montreal)

Society for the History of Technology (J. J. Beer, Dept. of History, Univ. of Delaware, Newark)

Society of the Sigma Xi (T. T. Holme, Sigma Xi, 51 Prospect St., New Haven, Conn. 06511)

Society of Technical Writers and Publishers (G. Marx, Director of Communications, Illinois Inst. of Technology, Research Inst., Chicago)

27–29. American **Philosophical** Assoc., Boston, Mass. (L. E. Hahn, Dept. of Philosophy, Southern Illinois Univ., Carbondale 62903)

27–30. American **Statistical** Assoc., Chicago, Ill. (D. C. Riley, ASA, 810 18th St., NW, Washington, D.C. 20006)

28–30. American **Economic** Assoc., annual, Chicago, Ill. (H. F. Williamson, AEA, 629 Noyes St., Evanston, Ill.)

28–30. American **Geophysical** Union, Seattle, Wash. (W. W. Kellogg, Rand Corp., 1700 Main St., Santa Monica, Calif.)

28–30. **Linguistic** Soc. of America, New York, N.Y. (A. A. Hill, Post Office Box 8120, University Station, Austin, Tex.)

28–30. Western Soc. of **Naturalists**, Univ. of Washington, Seattle. (I. A. Abbott, Hopkins Marine Station of Stanford Univ., Pacific Grove, Calif.)

January

5–7. **Glass Formation, Phase Equilibria, Nucleation and Crystal Growth,** symp., Sheffield, England. (D. Hawksworth, Soc.

of Glass Technology, Thorton, 20 Hallam Gate Rd., Sheffield 10)

5–8. **Solid State Physics,** 2nd annual conf., H. H. Wills Physics Laboratory, University of Bristol, England. (Administrative Assistant, Inst. of Physics and Physical Soc., 47, Belgrave Sq., London S.W.1)

6–8. **Industrial Electronics and Control Instrumentation,** 13th annual conf., Philadelphia, Pa. (E. Weiss, Sun Oil Co., Marcus Hook, Pa.)

6–9. **Psychopharmacological** Conf., Czechoslovak Medical Soc., Psychiatry Section, Jesenik Spa. (M. Vojtechovsky, Budejovicka 800, Pavilion A1, Prague, Czechoslovakia)

8–9. **Orthopaedic** Research Society, New York, N.Y. (R. A. Calandruccio, 869 Madison Ave., Memphis, Tenn.)

9–14. American Acad. of **Orthopedic Surgeons,** annual, New York, N.Y. (H. K. Hart, AAOS, 29 E. Madison, Chicago 2, Ill.)

10–16. The **New Science,** symp., Colorado Springs, Colo. (F. A. Sondermann, Colorado College, Colorado Springs)

11–14. **Civilian and Military Uses of Aerospace,** conf., New York, N.Y. (I. B. Laskowitz, New York Acad. of Sciences, 2 E. 63 St., New York)

12–14. **Reliability and Quality Control,** symp., Miami, Fla. (H. D. Hulme, Westinghouse R&D Center, Bldg. 601-1346, Churchill Boro, Pittsburgh, Pa.)

12–15. **Crustacea,** symp., Cochin, India. (Marine Biological Assoc. of India, Marine Fisheries P.O., Mandapam Camp, S. India)

14. American **Genetic** Assoc., Washington, D.C. (W. R. Singleton, Biology Bldg., Univ. of Virginia, Charlottesville)

18–20. **Solar Radiation Simulation,** intern. conf., Los Angeles, Calif. (H. F. Sander, Inst. of Environmental Science, 34 S. Main St., Mount Prospect, Ill.)

19. American Inst. of **Mining, Metallurgical,** and **Petroleum** Engineers, Metallurgical Soc., 7th mechanical working conf., Pittsburgh, Pa. (R. W. Shearman, Secretary, Metallurgical Soc. of AIME, 345 E. 47 St., New York 10017)

19. **Cor Pulmonale,** New York Heart Assoc., New York, N.Y. (NYHA, 10 Columbus Circle, New York 10019)

19–20. **Die Design and Press Tooling** Conf., American Soc. of Tool and Manufacturing Engineers, Hartford, Conn. (M. Zapico, Asst. Conf. Director, ASTME, 10700 Puritan Ave., Detroit 38, Mich.)

20–22. **Instrumentation,** College Station, Tex. (P. T. Eubank, Chemical Engineering Dept., Texas A&M Univ., College Station)

20–23. National Soc. of **Professional Engineers,** New Orleans, La. (P. H. Robbins, 2029 K St., NW, Washington, D.C.)

22. **Bibliographical** Soc. of America, New York, N.Y. (Mrs. H. C. Ralph, P.O. Box 397, Grand Central Station, New York 10017)

22–1. **Earthquake Engineering,** 3rd world conf., Auckland and Wellington, New Zealand. (Administrative Secretary, Third World Conf. on Earthquake Engineering, P.O. Box 5180, Wellington)

22–23. **Blood,** annual symp., Detroit, Mich. (W. H. Seegers, Dept. of Physiology and Pharmacology, Wayne State Univ. College of Medicine, Detroit)

22–23. **Hydrocarbon Analysis,** symp., American Soc. for Testing and Materials,

Houston, Tex. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

25–26. **Fundamental Phenomena in the Material Sciences**, 3rd annual symp., Boston, Mass. (D. B. Fay, Ilikon Corp., Natick Industrial Centre, Natick, Mass.)

25–26. **Viruses of Laboratory Rodents**, symp., Atlanta, Ga. (R. Holdenried, Natl. Cancer Inst., NIH, Bethesda, Md. 20014)

25–27. American Inst. of **Aeronautics and Astronautics**, New York, N.Y. (J. Bidwell, AIAA, 1290 Avenue of the Americas, New York 10019)

25–28. American **Meteorological** Soc., annual, New York, N.Y. (K. Spengler, AMS, 45 Beacon St., Boston 8, Mass.)

25–28. American Society of **Heating, Refrigerating and Air-Conditioning Engineers**, Chicago, Ill. (R. C. Cross, 345 E. 47 St., New York 10017)

25–28. Modern Methods of **Analytical Chemistry**, 18th annual intern. symp., Baton Rouge, La. (P. W. West, Dept. of Chemistry, Louisiana State Univ., Baton Rouge)

25–28. **Cardiovascular Diseases**, 2nd natl. conf., Washington, D.C. (C. H. Maxwell, 9650 Wisconsin Ave., NW, Washington, D.C. 20014)

25–29. American **Mathematical** Soc., Denver, Colo. (G. L. Walker, AMS, 190 Hope St., Providence, R.I.)

25–29. American Soc. for **Testing and Materials**, steel meeting, Mexico City. Mexico. (H. H. Hamilton, Public Relations, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

25–30. American **Library** Assoc., Washington, D.C. (D. H. Clift, ALA, 50, E. Huron St., Chicago, Ill.)

26. Quasi Stellar **Radio Sources**, American Inst. of Physics, New York, N.Y. (E. H. Kone, AIP, 335 E. 45 St., New York)

26. **Mossbauer Effect Methodology**, symp., New York, N.Y. (M. Ress, New England Nuclear Corp., 575 Albany St., Boston, Mass.)

26–29. Canadian **Pulp and Paper** Assoc., technical, annual, Montreal. (Miss J. M. McKenzie, CPPA, Technical Section, 2280 Sun Life Bldg., Montreal 2)

27–30. American **Group Psychotherapy** Assoc., annual, San Francisco, Calif. (AGPA, Inc., 1790 Broadway, Room 516, New York, N.Y. 10019)

27–30. American **Physical** Soc., New York, N.Y. (K. K. Darrow, Pupin Physics Laboratory, Columbia Univ., New York)

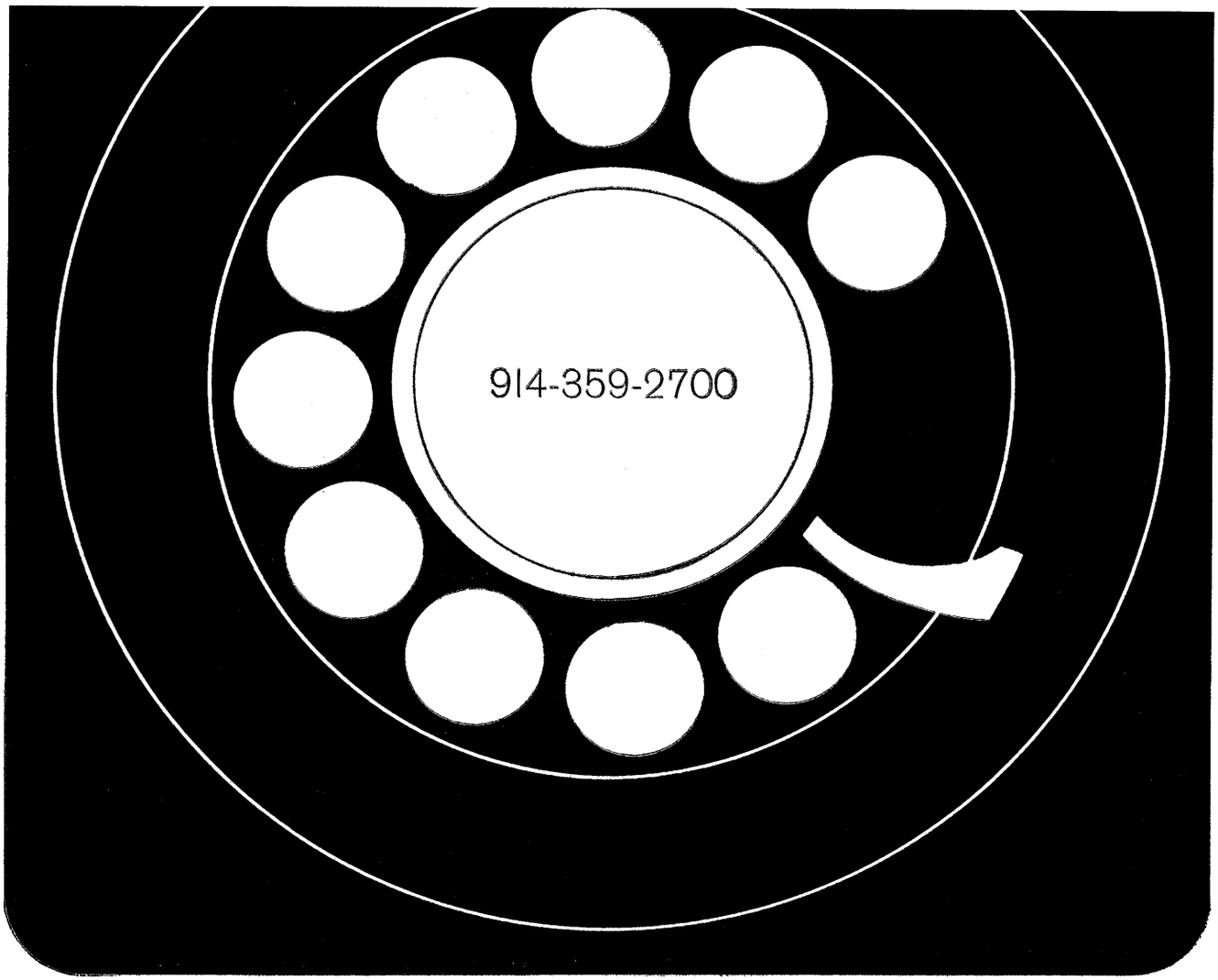
27–30. **Electrochemistry**, 5th seminar, Karaikudi-3, South India. (M. A. V. Devanathan, Central Electrochemical Research Institute, Karaikudi-3)

27–30. **Geological** Soc., Southwestern Federation, Austin, Tex. (S. P. Ellison, Jr., Department of Geology, Univ. of Texas, Austin)

27–31. **Neurosurgical** Soc. of America, San Juan, Puerto Rico. (C. H. Davis, Jr., Bowman Gray School of Medicine, Winston-Salem, N. C.)

28–29. Interactions of **Man and His Environment**, symp., Chicago, Ill. (W. K. Stuckey, Dept. of Public Relations, 1802 Chicago Ave., Northwestern Univ., Evanston, Ill. 60201)

28–29. **Rheology** Soc., winter meeting, Santa Barbara, Calif. (R. S. Porter, California Research Corp., Richmond Laboratory, 576 Standard Ave., Richmond 94802)



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Four-speed rotator (speeds 15, 30, 45, 75 rev/min) for mixing specimens for blood and spinal-fluid counts and sedimentation-rate, hemoglobin, and hematocrit determinations in vaccine bottles, test tubes, or dialysis cells. Base-tilting screws permit variation of rotation plane to aid mixing. Friction drive permits mixing discs to be stopped manually at any time for removal or placement of tubes, vaccine bottles, or dialysis cells. Five discs available: 17-E, with 20 clips for 13- to 16-mm tubes or vials; 17-A, 8 vaccine-bottle holders and 8 microdialysis cell clips; 17-B, 12 test-tube holders and 8 microdialysis cell clips; 17-C, 4 micro- and 4 macrodialysis cell clips; 17-D, 24 test-tube and 8 vaccine-bottle holders. A 22-watt motor, 115 volts, 60 cy, a-c.—D.J.P. (Technilab Instruments, 2231 S. Carmelina Ave., Los Angeles 64, Calif.)

Circle 1 on Readers' Service card

Laboratory emergency chart lists in detail first-aid procedures to be followed in cases of thermal and chemical burns, electrical shock, wounds, fractures, swallowed or inhaled poisons, and shock. The two chief techniques of artificial respiration are explained with illustrations, and common laboratory fires are classified along with proper extinguishing methods for each. In addition, the eight basic principles of first-aid are listed, and there is space for filling in emergency phone numbers. The 16- by 20½-inch chart is printed on a plastic-paper combination with metal strips at top and bottom and a metal loop for hanging.—D.J.P. (Fisher Scientific Co., 415 Fisher Bldg., Pittsburgh, Pa. 15219)

Circle 2 on Readers' Service card

Micromanipulator drives are small, limited excursion positioners which provide high sensitivity motion at low cost. The set of Brinkmann HS drives consists of two short precision dovetails mounted at right angles. They are driven by a micrometer screw with a large, knurled head. The excursion of each dovetail is only 0.25 inch (6 mm), but the optional graduated scale and pointer assembly divide this motion into 0.0005-inch calibrations. Maximum recommended magnification in each direction is 500×. The complete unit, which measures only 3 by 3 by 1½ inches (75 by 75 by 38 mm), can be used alone or in conjunction with larger, coarser manipulators. The drives are mounted in a 90° tilting hinge to provide convenience and versatility in mounting the HS on other manipulators. An instrument clamp, provided with the unit, is universally adjustable in two planes, has a bed ⅞ inch (22 mm) long, and will accommodate objects up to ¼ inch (6 mm). A small column stand consisting of a horseshoe base and a ¾ inch diameter upright with a vertical sliding bracket is optional. The size, sensitivity, and low cost of this unit make it attractive for application requiring very fine motion over relatively short excursions.—D.J.P. (Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590)

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Preparative ultracentrifuge is a floor-mounted, heavy-duty instrument designed for large-volume preparative work and high-resolution density-gradient applications. For preparative work, a 6- by 250-ml rotor, operating at 19,000 rev/min, produces 57,000*g*. For density-gradient centrifugation, a 6- by 15-ml rotor operates at 25,000 rev/min, producing 112,000*g*. The rotor is driven by a 1½-hp motor through a 4.15-to-1 belt drive, and the rotor bearings are water cooled. Rotor speed is regulated by a solid-state control system and is monitored by a 0-to-30,000-rev/min meter with 500-rev/min graduations. An electric timer provides indication of from 6 to 180 minutes elapsed time. The temperature of the rotor contents is regulated to ±1°C from ambient to below 0°C by an electronic controller with thermistor input. A vacuum system with a capacity of 150 lit./min evacuates chamber to less than 50 μ. A protective relay system stops the drive if the provision of cooling water, vacuum, or oil is inadequate. Dimensions of the unit are 39 by 45 by 30 inches, and weight is 1260 lb. A single knob selects function: refrigeration, precool, vacuum, centrifuge, coast, and electric brake. Separate knobs select rotor contents' temperature, speed, and elapsed time, and meters indicate temperature, speed, and hours of operation.—D.J.P. (International Equipment Co., 300 Second Ave., Needham Heights, Mass. 02194)

Circle 4 on Readers' Service card

Prothrombin meter utilizes photoelectric absorptiometry for automatic measurement of prothrombin times by Owren's prothrombin, Quick's one-stage, or Thrombotest method. Blood plasma sample, in a disposable test tube, is placed in the sample chamber. With calcium chloride added to the plasma, the time recorder is started and the sample thoroughly mixed. Turbidity develops immediately before actual clotting is visible; reduced light to the photocell causes meter deflection. At the point of clotting, deflection is sufficient to actuate a relay and stop the time recorder; time (seconds) is read directly from a digital counter. The instrument (Evans Electroselenium, England) comprises two individual but identical units in one casing; two tests can be run (or one duplicated) simultaneously. Light source for both units is a 6-volt, 6-watt prefocus lamp; detectors are 25-mm selenium photocells. Standardization is by setting initial readings to a calibration mark on the panel meter. Sample chambers are thermocontrolled to 37°C. Dimensions: 38 × 25.5 × 15.2 cm. Weight: 10.43 kg.—D.J.P. (Borders Electronics Co., Route 130 and Bethel Ave., Pennsauken, N.J.)

Circle 5 on Readers' Service card

The material in this section is prepared by the following contributing writers:

Denis J. Prager (D.J.P.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither *Science* nor the writers assume responsibility for the accuracy of the information. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 1519 and 1609. Circle on this card the department number of the items in which you are interested.

oxides" by André Rosowsky; "Aziridines" by Paul E. Fanta; "Ethylene sulfides" by Delbert D. Reynolds and Donald L. Fields, and "Oxaziranes" by W. D. Emmons; pt. 2, "Thietane and its derivatives" by Y. Etienne, R. Soulas, and H. Lumbroso; "β-lactones" by Y. Etienne and N. Fischer; "Trimethyleneimines" by James A. Moore; "Four-membered rings containing two heteroatoms" by W. D. Emmons, and "Oxetanes" by Scott Searles, Jr.

Initiation à la Théorie de la Relativité. Vladimir Kourganoff. Presses Universitaires de France, Paris, 1964. 182 pp. Illus. Paper.

Interprétation Géochimique des Éléments en Traces dans les Roches Cristallines. Denis M. Shaw. Masson, Paris, 1964. 244 pp. Illus. Paper, F. 56.

Introduction to Astrophysics: The Stars. Jean Dufay. Translated from the French edition (1961) by Owen Gingerich. Dover, New York, 1964. 176 pp. Illus. Paper, $2.

Introduction to Computer Programming. Donald I. Cutler. Prentice-Hall, Englewood Cliffs, N.J., 1964. 224 pp. Illus. $9.35.

Introduction to Fortran. A program for self-instruction. S. C. Plumb. McGraw-Hill, New York (© 1961), 1964. 215 pp. Illus. Paper, $3.50.

Introduction to Mine Surveying. W. W. Staley. Stanford Univ. Press, Stanford, Calif., ed. 2, 1964. 317 pp. Illus. $7.50.

Introduction to p-Adic Numbers and Valuation Theory. George Bachman. Academic Press, New York, 1964. 183 pp. Illus. Paper, $3.45; cloth, $6.50.

An Introduction to Radioactivity. Eric Neil Jenkins. Butterworth, Washington, D.C., 1964. 201 pp. Illus. $5.95.

Introduction to Semiconductor Physics. R. B. Adler, A. C. Smith, and R. L. Longini. Wiley, New York, 1964. 263 pp. Illus. Paper, $2.65; cloth, $4.50.

Introduction to the Atomic Nucleus. J. G. Cuninghame. Elsevier, New York, 1964. 232 pp. Illus. $9.

The Language of Triangles. A secondary school trigonometry. vol. 1. A. W. Crown. Pergamon, London; Macmillan, New York, 1964. 125 pp. Illus. Paper, $2.45.

The Laws and Applications of Thermodynamics. A. D. Buckingham. Pergamon, London; Macmillan, New York, 1964. 218 pp. Illus. Paper, $3.75.

Linear Representations of the Lorentz Group. M. A. Naimark. Translated from the Russian edition (Moscow, 1958) by Ann Swinfen and O. J. Marstand. H. K. Farahat, Translation Ed. Pergamon, London; Macmillan, New York, 1964. 464 pp. Illus. $14.50.

Manuel Pratique de Chromatographie en Phase Gazeuse. J. Buzon, N. Guichard, G. Guiochon, J. Lebbe, A. Prévot, J. Tranchant, and J. Serpinet. Masson, Paris, 1964. 235 pp. Illus. Paper, F. 36.

Marine Geology of the Gulf of California. A symposium (Memoir No. 3). Tjeerd H. van Andel and George G. Shor, Jr., Eds. American Assoc. of Petroleum Geologists, Tulsa, Okla., 1964. 414 pp. Illus. Charts. $12.50. Sixteen papers and three charts (in a separate pocket).

Massenspektrometrie. C. Brunnée and H. Voshage. Thiemig, Munich, Germany, 1964. 328 pp. Illus. DM. 54.

Mathematics: Its Contents, Methods,

Dissymmetries

Browsing through the 1964 crop of papers on light scattering, we have prepared, along the way, a short list of the systems that have been studied by means of Brice-Phoenix Light Scattering Photometers (LSP) and Differential Refractometers (DR). Here, then, are our findings based on a somewhat less than thorough search of the papers published during the first eight months of 1964.

DETERGENTS AND MICELLAR COLLOIDS

Phosphatidylserine (Abramson, Katzman and Gregor, J. Biol. Chem., *239*, 70)—LSP
Sodium lauryl sulfate and dodecyltrimethylammonium bromide (Anacker, Rush and Johnson, J. Phys. Chem., *68*, 81)—LSP, DR
Sodium 2,6-di-n-alkylnaphthalene-1-sulfonates (Heilweil, J. Colloid Sci., *19*, 105)—LSP, DR
Dimethyldodecylamine oxide (Herrmann, J. Phys. Chem., *68*, 1540)—LSP, DR
Sodium dodecyl benzene sulfonate-nonionics mixed micelles (Mankowich, J. Am. Oil Chem. Soc., *41*, 449)—LSP

SYNTHETIC POLYMERS

Aromatic polysulfonates (Thomson and Ehlers, J. Polymer Sci., *A2*, 1051)—LSP, DR
Poly-n-alkyl acrylates (Burlant, Hinsch and Taylor, J. Polymer Sci., *A2*, 57)—LSP, DR
Polyhydroxy ether (Myers and Dagon, J. Polymer Sci., *A2*, 2631)—LSP, DR
Nylon 66 (Elias and Schumacher, Makromol. Chem., *76*, 23; Saunders, J. Polymer Sci., *A2*, 3755, 3765)—LSP, DR
Styrene-methyl methacrylate block copolymer (Krause, J. Phys. Chem., *68*, 1948)—LSP, DR
Polymers of higher olefins (Flowers, Hewett and Mullineaux, J. Polymer Sci., *A2*, 2305)—LSP
Polyisobutene (Turner, J. Phys. Chem., *68*, 1255)—LSP
Polystyrene (Graessley, J. Phys. Chem., *68*, 2258; Spitsbergen and Beachell, J. Polymer Sci., *A2*, 1205)—LSP
Polymethyl methacrylate (Krause and Cohn-Ginsberg, J. Polymer Sci., *A2*, 1393)—LSP
Styrene-acrylonitrile copolymer (Shimura, Mita and Kambe, J. Polymer Sci., *B2*, 403)—LSP
Polyethylene and polystyrene (Ehl, Loucheux, Reiss and Benoit, Makromol. Chem., *75*, 35)—DR
Polyethylene (Drott and Mendelson, J. Polymer Sci., *B2*, 187)—DR
Polyvinylpyrrolidone (Schnabel, Makromol. Chem., *77*, 51)—DR
Polydimethylsiloxane (Crescenzi and Flory, J. Am. Chem. Soc., *86*, 141)—DR
Poly-p-chlorostyrene (Greber, Tölle and Burchard, Makromolek. Chem., *71*, 47)—DR
Copolymers (Gallot, Franta, Rempp and Benoit, J. Polymer Sci., Pt. C, No. 4, 473)—DR

PROTEINS

Dog cardiac myosin (Mueller, Franzen, Rice and Olson, J. Biol. Chem., *239*, 1447)—LSP, DR
Gelatins from rat skin collagen (Piez and Carrillo, Biochemistry, *3*, 908)—LSP, DR
Contractile sheath protein of the tail of T2 bacteriophage (Sarkar Sarkar and Kozloff, Biochemistry, *3*, 511)—DR
Empty protein shells of turnip yellow mosaic virus (Kaper, Biochemistry, *3*, 486)—DR

POLYSACCHARIDES

Dextran (Antonini, Bellelli, Caputo, Chiancone and Rossi-Fanelli, Biopolymers, *2*, 27, 35)—LSP, DR

ELECTROLYTES

Alkaline niobium (V) solutions (Nelson and Tobias, Can. J. Chem., *42*, 731)—LSP

DISPERSIONS

Octanoic acid aerosols (Matijevic, Kitani and Kerker, J. Colloid Sci., *19*, 223)—LSP
Colloidal gold (Milligan and Morriss, J. Am. Chem. Soc., *86*, 3461)—LSP
Spinach chloroplasts (Dilley and Vernon, Biochemistry, *3*, 817)—LSP
Emulsions and polymer latexes (Graessley and Zufall, J. Colloid Sci., *19*, 516)—LSP, DR
Substituted styrene polymer latexes (Paoletti and Billmeyer, J. Polymer Sci., *A2*, 2049)—DR

If you are interested in light scattering and refractive index measurements on the systems listed above, or many others, from cellulose propionate plastic films (Sperling, TAPPI, *44*, 280) to spider fibers (Matijevic, Ottewill and Kerker, J. Opt. Soc. Am., *51*, 115), contact the **Phoenix Precision Instrument Company,** 3803 North 5th Street, Philadelphia, Pa., 19140, for detailed information on Light Scattering Photometers and Differential Refractometers.

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(Continued from page 1566)

Honorable mention for newspapers goes to Ronald Kotulak, science writer for the Chicago *Tribune*, for a series on plasma physics. The judges reported that, because of the high quality of the magazine entries, they were unable to agree on an honorable mention award in that category.

The awards were established in cooperation with the Westinghouse Educational Foundation in 1946 to help improve the quality of science writing for laymen and to stimulate public interest in and understanding of science.

The **University of Wisconsin** has announced the establishment of a 4-year experiment designed to provide university courses and credits for engineers unable to spend lengthy periods on the Wisconsin campus. The project is scheduled to begin in February, and will enable Wisconsin engineers to update their professional education and earn a master's degree while on the job. The university's educational facilities are being made available under its Articulated Instructional Media program. (Edward Obert, chairman of the mechanical engineering department at the University, Madison 53706.)

Rice University has announced plans for a 10-year expansion and development program. Plans call for an increase in the faculty from 225 to almost 400; a student body increase from 2300 to 4000; tripling the annual operating budget from $6 million to $19 million; and addition of $33 million in capital improvements and endowment, which are to include $21 million for physical facilities, and $12 million for endowed professorships and additional faculty salaries. Also planned is the establishment of a program of Latin American studies. Included in proposed projects to strengthen and expand Rice departments is one to enlarge the biology department with the development of studies in biochemistry, biophysics, and cell biology.

Meeting Notes

Rubber chemistry and technology will be discussed at the American Chemical Society's division of rubber chemistry meeting, scheduled 4–7 May, in Miami Beach. General papers in the field and papers dealing with the chemical and physical testing of rubber are being solicited. Deadline for eight copies of a 200-word abstract: *25 January*. (G. N. Vacca, Bell Telephone Laboratories, Murray Hill, New Jersey)

Atlantic City, New Jersey, will be the site of the **American Society for Microbiology**'s annual meeting, 25–29 April. Contributed abstracts on all phases of microbiology are being solicited. Abstracts must be submitted on ASM abstract forms. Deadline for submission: *6 January*. (R. W. Sarber, Executive Secretary, ASM, 115 Huron View Blvd., Ann Arbor, Michigan)

Grants, Fellowships, and Awards

The National Science Foundation will sponsor an Academic Year Institute in **Anthropology** for college and junior college teachers, at the University of Colorado during 1965–66. Participants will combine special Institute courses in cultural and physical anthropology with formal work in regular departments and will be eligible for the M.A. degree. Fifteen stipends of $3000, plus NSF dependency, book, and travel allowances are available. Applicants must be regular, full-time college or junior college teachers, with three or more years of teaching experience and regular teaching commitments involving at least one course in anthropology. Deadline for receipt of applications: *20 January*. (J. Kelso, AYI in Anthropology, Department of Anthropology, University of Colorado, Boulder)

Courses

The University of Maryland will conduct a seminar in **Analog Simulation and Engineering Analysis**, 25–29 January. The program is being offered in cooperation with the research and computation division of Electronic Associates, Inc., and is designed to give scientists and engineers a knowledge of the analog computer and its applications. The level of instruction will be at first year graduate work, and requires a bachelor's degree in engineering, mathematics, or a physical science, including one semester, or the equivalent, in differential equations. Laboratory sessions will provide students with various programming problems and opportunities to work with EAI TR-20